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### "2. Elements of *α Geminorum* (Castor).

"This orbit is deduced from a discussion of all the observations that I have been able to collect; but greater weight has been attached to the early micrometrical measures of Sir W. Herschel than to the allignments of Bradley and Pound. The elements are entirely different from those previously computed by Sir John Herschel and M. Mädler, and this difference is materially owing to the great influence exercised by the recent measures at Mr. Bishop's Observatory by Mr. Dawes. No one, I think, who is acquainted with this gentleman's labours in sidereal astronomy, will deny that his results are of first-rate excellence; and it has been solely from this conviction that I have ventured to communicate to the Society an orbit so widely different from those which have already appeared.

Perihelion passage, 1699·26.

| | ° | ′ |
|---|---|---|
| Projected place of perihelion | 8 | 15 |
| Node | 11 | 24 |
| Angle between ϖ and ☊ on orbit | 356 | 22 |
| Inclination | 43 | 14 |
| Eccentricity | 0·2405 | |
| Mean annual motion | — 34′·163 | |
| Semi-axis major | = 6″·300 | |

Period, $632^{\text{yrs}}$·27.

"I ought, perhaps, to mention that I employ the recent improvements on Sir John Herschel's method, for which I have been indebted to his kindness. These alterations in the original plan simplify the process very considerably.

"I have not had leisure to compare these elements with the whole series of measures; but the partial comparison made for the purpose of verification is quite satisfactory. The stars should be slowly opening at the present time, if my elements are any thing like the truth.

### "3. Elements of *σ Coronæ*.

"The orbit for this star is deduced from the whole series of published measures, and also from those recently made at this observatory by Mr. Dawes.

Perihelion passage, 1826·48.

| | ° | ′ |
|---|---|---|
| Node | 21 | 3 |
| Inclination | 25 | 39 |
| Projected perihelion | 88 | 25 |
| Angle between ϖ and ☊ on orbit | 69 | 24 |
| Mean annual motion | + 29′·313 | |
| Semi-axis major | 5″·194 | |
| Eccentricity | 0·7256 | |

Period, 737 years.

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"For the calculation of the angle of position ($\theta$) and distance ($\varrho$) we have,

$$E - [3{\cdot}39698] \sin E = [1{\cdot}46706] \, (1826{\cdot}48 - t)$$
$$\tan \tfrac{1}{2} v = [0{\cdot}39928] \tan \tfrac{1}{2} E$$
$$\tan (\theta - 21^\circ \, 3') = [9{\cdot}95494] \cdot \tan (v + 69^\circ \, 24')$$
$$\varrho = [0{\cdot}55319] \cdot \frac{\sin E}{\sin v} \cdot \frac{\cos (v + 69^\circ \, 24')}{\cos (\theta - 21^\circ \, 3')}$$

"I have made an unsuccessful attempt to determine the elements of *τ Ophiuchi.* I think the period will prove to be about 120 years; but this must remain for verification. "J. R. HIND.

"*Mr. Bishop's Observatory, Regent's Park,*
"*December* 12, 1845."

## IX. Extract of a Letter from Sir John Herschel to the President, dated Collingwood, November 29, 1845.

"Being on the subject of the satellites of *Saturn*, I will mention here a singularity which, though obvious enough, has not (so far as I am aware) been noticed before, viz. that the periodic time of the first satellite (first in order of the ring) is *precisely* half that of the third, and the periodic time of the second *precisely* half that of the fourth. This is far too remarkable and close a coincidence to be merely casual, and (the second satellite being a certainty) the extension of the law to the first (a law so out of the way and unlikely) would of itself be evidence of its real existence, even had it not been (as it now certainly has been) re-observed. If such atoms perturb one another's motions, there must be some very odd secular equations arising from this singularity. It is not worth while to make a formal communication of such a thing to the Astronomical Society; but if you think it worth your verbal mention at the meeting, it may be interesting to those (if any) who are busy about satellitary perturbations."

## X. On a new Double-image Micrometer, communicated in a Letter to the President, by Professor Powell.

"My dear Sir,—The following suggestion for a very simple double-image micrometer occurred to me a few years ago; but not having much practical acquaintance with these matters, I should hardly have supposed it to possess novelty or prospect of utility enough to render it worthy the notice of the Astronomical Society, had you not encouraged me to communicate it.

"The optical principle is merely that of a ray of light, refracted obliquely through a plate of glass with parallel surfaces, and emerging parallel to, but not coincident with, its original direction.

"If, then, such a plate intercept half the cone of rays going from the object-glass of a telescope to its focus, there will be formed, at the focus, besides the direct, a deviated image; and the angular deviation will be dependent on the inclination, the thickness, and the refractive power of the glass, involving a constant factor

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